

ABSTRACT

A noise reduction apparatus used to increase the signal-to-noise ratio (SNR) of an optical signal is provided. The structure of the noise reduction apparatus may be based on 5 the Mach-Zehnder interferometer. To increase the SNR, the noise reduction apparatus makes use of the coherence of a coherent component of an optical signal having a coherent signal power and the incoherence of an incoherent component of the optical signal having an incoherent signal power. The 10 optical signal is split in two path signals with each path signal having the same intensity but a different phase. The phase difference is tuned in a manner which produces a main output optical signal containing most of the coherent signal power and containing a fraction of the incoherent signal power, 15 with the remaining incoherent signal power being diverted to one or more subsidiary outputs.